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(71)Applicant : OLYMPUS OPTICAL CO LTD

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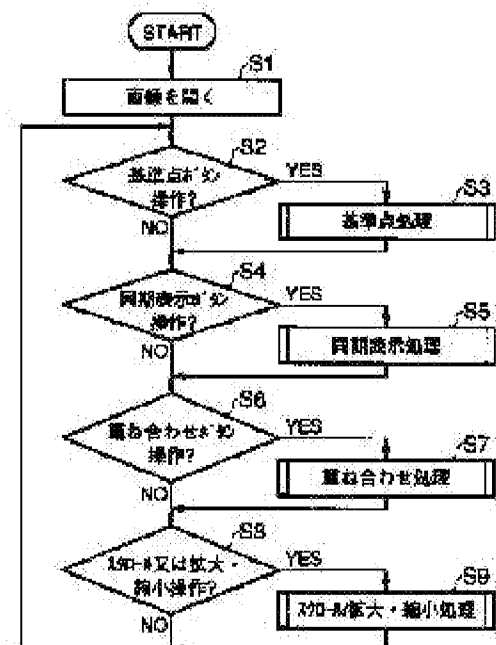
(72)Inventor : TOKIWA HIROYUKI
AKASHI HIROYUKI
NISHIYAMA HIROTO

(54) METHOD AND DEVICE FOR IMAGE DISPLAY AND STORAGE MEDIUM WHERE PROGRAM ACTUALIZING IMAGE SYNCHRONOUS DISPLAY IS RECORDER

(57)Abstract:

PROBLEM TO BE SOLVED: To provide the image display method which enables detailed comparative observation by specifying reference points of multiple display images and relating the display images to one another, and thus making synchronous display.

SOLUTION: This method has a 1st display step (S1) for displaying a 1st image in a 1st screen area on a monitor screen and a 2nd image in a 2nd screen area, specification steps (S2, S3) for making a user to specify a reference point on the 1st image and a reference point on the 2nd image according to the display made in the 1st display step (S1), and a 2nd display step (S5) for adjusting the display position of the image in one of the 1st and 2nd screen areas and redisplaying it so that the coordinates of the reference point in the 1st screen area and the coordinates of the reference point in the 2nd screen area are relatively equal to each other.



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CLAIMS

[Claim(s)]

[Claim 1]An image display method comprising:

The 1st displaying step that displays the 1st picture on the 1st screen area of applied monitor display, and displays the 2nd picture on the 2nd screen area.

Based on a display by the 1st displaying step of the above, a position arbitrarily set up by operator, respectively about the 1st picture in the 1st screen of the above, and the 2nd picture in the 2nd screen of the above, A reference point recognition step recognized as each reference point on these 1st pictures and the 2nd picture, The 2nd displaying step that adjusts and carries out redisplay of the display position of the picture concerned in a screen area of either one of [above] the 1st or the 2nd so that coordinates of a reference point in the 1st screen area of the above and coordinates of a reference point in the 2nd screen area of the above may become equal relatively.

[Claim 2]A directions step which directs scrolling of the picture concerned in a screen area of either one of [above] the 1st or the 2nd, The image display method according to claim 1 having further a step which scrolls the picture concerned in any of the above, or a screen area of another side synchronizing with a picture by which the above-mentioned scroll instruction was made.

[Claim 3]A step which directs change of display magnification of the picture concerned in a screen area of either one of [above] the 1st or the 2nd, responding to directions of change of the above-mentioned display magnification -- one of the above -- an image display method given in claim 1 having further a step which changes the picture concerned in a screen area of another side into the same display magnification as a picture by which directions of the above-mentioned display magnification change were made, or any 1 paragraph of 2.

[Claim 4]responding to a step which directs superposition of the 1st and 2nd picture of the above, and directions of the above-mentioned superposition -- a display image of the 1st screen area of the above, and a display image of the 2nd screen area of the above -- pile up -- with a step which displays a picture on the 3rd viewing area. The image display method according to any one of claims 1 to 3 having in a pan.

[Claim 5]An information processor which inputs the 1st and 2nd picture, and is put in order and displayed on monitor display, comprising:

The 1st display control means that displays the 1st picture of the above on the 1st screen area of the above-mentioned monitor display, and displays the 2nd picture of the above on the 2nd screen area.

Based on a display by the 1st display control means of the above, a position arbitrarily

set up by operator, respectively about the 1st picture in the 1st screen of the above, and the 2nd picture in the 2nd screen of the above, A reference point recognition means to recognize as each reference point on these 1st pictures and the 2nd picture, The 2nd display control means that adjusts and carries out redisplay of the display position of the picture concerned in a screen area of either one of [above] the 1st or the 2nd so that coordinates of a reference point in the 1st screen area of the above and coordinates of a reference point in the 2nd screen area of the above may become equal relatively.

[Claim 6]A recording medium with which a program for performing an image display method was recorded, comprising:

A step which displays the 1st picture on the 1st screen area of applied monitor display, and displays the 2nd picture on the 2nd screen area.

A step which recognizes a position arbitrarily set up by operator, respectively about the 1st picture in the 1st screen of the above, and the 2nd picture in the 2nd screen of the above based on a display by the above-mentioned step as each reference point on these 1st pictures and the 2nd picture, A step which adjusts and carries out redisplay of the display position of the picture concerned in a screen area of either one of [above] the 1st or the 2nd so that coordinates of a reference point in the 1st screen area of the above and coordinates of a reference point in the 2nd screen area of the above may become equal relatively.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the information processor provided with a means to realize the image display, and the recording medium, with which the program which realizes the image display was recorded, concerning the suitable image display method for the comparative observation of two or more pictures as which the same or different photographic subject was described.

[0002]

[Description of the Prior Art]Transmit the image data of the picture photoed by the electronic camera (it is also called a "digital still camera") etc. which spread is following quickly in recent years to information processors, such as what is called a personal computer (PC), and it is displayed, It has become easily to perform various image processing, such as a photo retouch, realizable. The utility value of the system which combined not only an electronic camera simple substance but an electronic camera, a special-purpose-machine machine, or general-purpose apparatus like an information processor is increasing day by day.

[0003]The picture of two or more sheets photoed by the electronic camera is displayed on monitor display side by side, and an example of the image comparing device for carrying out comparative observation is indicated to JP,6-6807,A. According to the device given in the gazette, picture comparison can be performed by easy operation, without dropping resolution on presenting a comparison display with the part images which do not perform a reducing process.

[0004]When not depending on exceptional structure like this image comparing device, in the former, the picture of two sheets is only indicated by parallel, And it was observing by an observer using the edit function which an observer sets and compares the relative physical relationship of the photographic subject between 2 pictures with mind, or is generally equipped in the information processor. For example, when comparative observation of the implementation order of expansion or a reducing process was carried out about the picture of the same photographic subject, full use of an edit function called "Undo; undoing" and "Redo; redo" using temporary storage (buffer) was made, image display was changed, and troublesome comparative observation was performed.

[0005]In the point that the display position of the photographic subject in a viewing area is unrelated, and is independently to it of other viewing areas, the structure of the image display for the comparative observation of these former is common. There is a problem that it is difficult to perform minute picture comparison.

[0006]

[Problem(s) to be Solved by the Invention]This invention is made in consideration of the above-mentioned situation, and is a thing.

The purpose is to provide the image display method which makes minute comparative observation possible because specify a reference point as *****, associate display images and this performs a synchronous display.

[0007]An object of this invention is to provide the information processor provided with a means to realize a described image display, and the recording medium, with which the program which realizes the image display was recorded.

[0008]

[Means for Solving the Problem]In order to solve an aforementioned problem and to attain the purpose, this invention is constituted as follows.

[0009][1] The 1st displaying step that an image display method of this invention displays the 1st picture on the 1st screen area of applied monitor display, and displays the 2nd picture on the 2nd screen area, Based on a display by the 1st displaying step of the above, a position arbitrarily set up by operator, respectively about the 1st picture in the 1st screen of the above, and the 2nd picture in the 2nd screen of the above, A reference point recognition step recognized as each reference point on these 1st pictures and the 2nd picture, It has the 2nd displaying step that adjusts and carries out redisplay of the display position of the picture concerned in a screen area of either one of [above] the 1st or the 2nd so that coordinates of a reference point in the 1st screen area of the above and coordinates of a reference point in the 2nd screen area of the above may become equal relatively.

[0010][2] A directions step which an image display method of this invention is a method given in the above [1], and directs scrolling of the picture concerned in a screen area of either one of [above] the 1st or the 2nd, It has further a step which scrolls the picture concerned in any of the above, or a screen area of another side synchronizing with a picture by which the above-mentioned scroll instruction was made.

[0011][3] A step which an image display method of this invention is a method the above [1] or given in either of [2], and directs change of display magnification of the picture concerned in a screen area of either one of [above] the 1st or the 2nd, responding to directions of change of the above-mentioned display magnification -- one of the above -- it has further a step which changes the picture concerned in a screen area of another side into the same display magnification as a picture by which directions of the above-mentioned display magnification change were made

[0012][4] A step which an image display method of this invention is a method the above [1] thru/or given in either of [3], and directs superposition of the 1st and 2nd picture of the above, responding to directions of the above-mentioned superposition -- a display image of the 1st screen area of the above, and a display image of the 2nd screen area of the above -- pile up -- it has further a step which displays a picture on the 3rd viewing area

[0013][5] In an information processor which an information processor of this invention inputs the 1st and 2nd picture, and is put in order and displayed on monitor display, The 1st display control means that displays the 1st picture of the above on the 1st screen area of the above-mentioned monitor display, and displays the 2nd picture of the above on the 2nd screen area, Based on a display by the 1st display control means of the above, a position arbitrarily set up by operator, respectively about the 1st picture in the 1st screen of the above, and the 2nd picture in the 2nd screen of the above, A reference point recognition means to recognize as each reference point on these 1st pictures and the 2nd picture, The 2nd display control means that adjusts and carries out

redisplay of the display position of the picture concerned in a screen area of either one of [above] the 1st or the 2nd so that coordinates of a reference point in the 1st screen area of the above and coordinates of a reference point in the 2nd screen area of the above may become equal relatively is provided.

[0014][6] A step which a recording medium of this invention displays the 1st picture on the 1st screen area of applied monitor display, and displays the 2nd picture on the 2nd screen area, A step which recognizes a position arbitrarily set up by operator, respectively about the 1st picture in the 1st screen of the above, and the 2nd picture in the 2nd screen of the above based on a display by the above-mentioned step as each reference point on these 1st pictures and the 2nd picture, A step which adjusts and carries out redisplay of the display position of the picture concerned in a screen area of either one of [above] the 1st or the 2nd so that coordinates of a reference point in the 1st screen area of the above and coordinates of a reference point in the 2nd screen area of the above may become equal relatively, It is the recording medium with which a program for performing an image display method which **** was recorded.

[0015](OPERATION) According to this invention which adjusts and carries out redisplay of the display position of the picture concerned in a screen area of either one of the 1st or the 2nd, minute picture comparison of a multiple image can be easily performed so that coordinates of a reference point in the 1st screen area and coordinates of a reference point in the 2nd screen area may become equal relatively. Even if a display image of the 1st and 2nd screen area that passed through the above-mentioned redisplay piles both up as they are, gap does not produce it into a stillness (eternal) portion of the same photographic subject.

[0016]

[Embodiment of the Invention]The outline view in which "composition" drawing 1 shows the hardware constitutions of one embodiment of this invention, and drawing 2 are the block diagrams showing the hardware constitutions of this embodiment. As shown in the figure, this embodiment is the composition that the picture of two or more sheets which the electronic camera 2 was connected via the connecting cord 35 to the personal computer 1 so that communication was possible, and changed, and was photoed by the electronic camera 2 is transmitted to the personal computer 1 via the connecting cord 35.

[0017]As shown in drawing 2, the personal computer 1 is constituted by CPU11, the memory part 12, the display control part 13, the display 14, the drive device 15, the disc medium 16, the keyboard part 17, and the interface (I/F) 18.

[0018]CPU11 is a means to manage control of the whole device concerned that the image display functions concerning this invention should be realized. The memory part 12 provides the operating memory space which may be used by CPU11. The display 14 is controlled via the display control part 13, and consists of a CRT monitor, a liquid crystal display, etc. which display various kinds of information and pictures visually. The disc medium 16 is a recording medium which comprises a hard disk, a floppy disk or a magneto-optical disc, etc., and is a recording medium which records the program for making a described image display function realizable, or records other varieties of information. The drive device 15 is equipped with this disc medium 16, and read-out or the writing of information is performed by this drive device 15. It may be substituted for the disc medium 16 by semiconductor memory, such as a sized memory card. The keyboard part 17 is a means by which a user inputs various information to the personal computer 1. The interface (I/F) 18 is an interface for communicating with the electronic camera 2 which is an external instrument via the connecting cable 35 connected to the contact button 19.

[0019]Drawing 3 is a figure showing the GUI (graphical user interface) screen which

realizes the picture comparison display concerning this embodiment. The GUI picture shown in the figure is displayed on the image display device 14 via CPU11 and the display control part 13. In the figure, 41 piles up a reference point button, and 42 makes a synchronous display button and 43 pile up mutually, and A button, 44 -- a zooming button and 45 -- the 2nd window and 46 show the reference point on the 1st window W1, 47 shows the reference point on the 2nd window W2, and, as for the 1st window and W2, the pulldown list for display magnification change and W1 show the scroll bar 48-51. The reference point button 41 and the synchronous display button 42 are toggle buttons. In the pulldown list 45 for display magnification change, one of display magnification can be chosen as the condition of "25%", "50%", "75%", and "100%" from some display magnification candidates by operating the mouse 17a etc. It may be substituted for the operation by the above 41, 42, 43, 44, and 45 by the menu selecting means which is not illustrated.

[0020]The same picture can be displayed on the 1st window W1 and the 2nd window W2, or a respectively different picture can also be displayed on them. Although it supposes that it aligns right and left (level) and the 1st window W1 and the 2nd window W2 are displayed on the monitor display 14 like [it is desirable and] this embodiment, Even if it is the upper and lower sides (vertical) and a case where align aslant, or make it pile up a part of both each other's windows, and it displays, the effect of this invention can be acquired.

[0021]On the picture displayed on the 1st window W1, the reference point 46 is a point which a user can specify as arbitrary positions, for example, is displayed as cross cursor (crosshair cursor). The reference point 47 is a point displayed as cross cursor like the reference point 46 with regards to the 2nd window W2, and is a point which a user can specify as arbitrary positions on the display image of the window.

[0022]The scroll bars 48 are a means to scroll the display image in the 1st window W1 perpendicularly, and a means by which the scroll bar 50 scrolls the display image horizontally. Similarly, a means by which the scroll bar 49 scrolls the display image in the 2nd window W2 perpendicularly, and the scroll bar 51 are means to scroll the display image horizontally. With the mouse 17a etc., it can be operational and these scroll bars can scroll independently the display images of the 1st window W1 and the 2nd window W2.

[0023]Drawing 4 "of operation" is a flow chart which shows the flow of the picture comparison display by the above-mentioned GUI picture.

[0024]The picture which specifies an image file name in the predetermined menu which does not carry out "Step S1" graphic display, or is displayed on other windows by drags and drops to the window of the GUI picture concerned. The picture of two sheets which will perform comparative observation from now on is opened by each of the 1st window W1 and the 2nd window W2 (it opens). Drawing 5 (a) shows the displaying condition of each picture immediately after opening.

[0025]In the state immediately after displaying, the reference point 46 of the display image in the 1st window W1 and the reference point 47 of the display image in the 2nd window W2 are set as the left corner of a picture as a default, respectively.

[0026]When the reference point button 41 is pushed by the user in the state where the picture of two sheets of "Step S2" comparison object is displayed, it shifts to the reference point processing (refer to drawing 5 (b)) in Step S3.

[0027]As shown in "Step S3 (reference point processing)" drawing 5 (b), based on the image display in the 1st window W1, a user specifies the reference point 46 on the top of the mountains who are the photographic subjects displayed, for example. And based on the image display in the 2nd window W2, the reference point 47 is specified as the same point (mountains' peak) in the same photographic subject. Specifying a reference point

first from the 2nd window W2, the appointed turn presupposes that it is arbitrary. The display image of the 1st window W1 and the display image of the 2nd window W2 are associated about the specified reference points 46 and 47.

[0028]When the synchronous display button 42 is pushed by the user in the state where the picture of two sheets of a "step S4" comparison object is displayed, and the reference point is specified as each of these pictures, it shifts to the synchronous display processing (refer to drawing 5 (c)) in Step S3.

[0029]As shown in "Step S5 (synchronous display processing)" drawing 5 (c), so that the coordinates of the reference point 46 in the 1st window W1 and the coordinates of the reference point 47 in the 2nd window W2 may become equal relatively, Here, while the display position of the picture in the 2nd window W2 is adjusted, redisplay of the picture concerned is carried out.

[0030]Before carrying out a synchronous display, the field angle of both images had shifted, but this gap is canceled after a synchronous display by the display position adjustment on the basis of the above reference points. The display position of the mountains who are the photographic subjects of the display image in the 1st window W1, and the surface of a lake, and the display position of the mountains who are the photographic subjects of the display image in the 2nd window W2, and the surface of a lake are relatively in agreement so that clearly from the figure. This becomes easy to compare pictures among both windows over details.

[0031]When it piles up in the state where "Step S6" synchronous display is made and the button 43 is pushed, it shifts to the superposition processing (refer to drawing 6) in Step S7.

[0032]the display image of the 1st window W1 of "Step S7 (pile up processing)", and the display image of the 2nd window W2 -- each picture -- being translucent (for example, the luminance value of a pixel is made into a half) -- after carrying out, it piles up.

[0033]drawing 6 (a) should pile up -- one target picture (display image of the 1st window W1) should be shown, and (b) should pile up -- the picture (display image of the 2nd window W2) of target another side is shown, and (c) shows the picture after superposition. This superposition picture is displayed in the 3rd window (un-illustrating) other than 1st window W1 and 2nd window W2.

[0034]Even if it makes the display image of the 1st window W1 and the 2nd window W2 pile up mutually as it is during a synchronous display, gap does not arise in the invariable region of the same photographic subject between 2 pictures. When the "moon" which is a photographic subject is displayed on coordinates (x1, y1) in the 1st window W1 and is displayed on coordinates (x2, y2) in the 2nd window W2 by this, as [show / in drawing 6 (c)] -- pile up -- according to the picture, it is not based on the field angle of a picture, but the situation of movement of the "moon" can be correctly grasped now on the basis of "mountains."

[0035]In the state where the state where "Step S8" synchronous display is not performed, or the synchronous display is performed. When either the zooming button 44, the pulldown list 45 for display magnification change or the scroll bars 48-51 are pushed, it shifts to scrolling or zooming processing (refer to drawing 5 (d)) in Step S7.

[0036]When enlarging buttons "+" are pushed among the "step S9 (scrolling or zooming processing)" zooming buttons 44, the picture to which only predetermined magnification expanded the picture concerned is generated, and redisplay of this expansion picture is carried out to the same window. On the other hand, when the reduction button "-" is pushed, the picture to which only predetermined magnification reduced the picture concerned is generated, and redisplay of this reduction image is carried out to the same window. When the pulldown list 45 for display magnification change is pushed, as

mentioned above, redisplay of the picture of the selected display magnification is generated and carried out.

[0037]When it is in the state where the synchronous display is not performed, a zooming indication only of the picture of the selected window is given independently. Thereby, the display magnification of only one picture can be changed before execution of a synchronous display, and a rough field angle can be doubled with the picture of another side.

[0038]On the other hand, when it is in the state where the synchronous display is performed, a zooming indication of the display image of the 1st window W1 concerning a synchronous display and the picture of the 2nd window W2 is given on the basis of the reference point specified as each picture at the same simultaneous and display magnification.

[0039]When the scroll bars 48-51 are pushed, the display image of the window area concerned is level, or a scroll display is carried out perpendicularly. Thereby in the window concerned, a non-display imaging range can be displayed.

[0040]When it is in the state where the synchronous display is not performed, only the picture of the applicable window of the operated scroll bar scrolls independently.

[0041]On the other hand, when it is in the state where the synchronous display is performed, as shown in drawing 5 (d), not only the picture of the applicable window of the operated scroll bar but the picture of other windows concerning a synchronous display synchronizes (linkage), and is scrolled.

[0042]As explained above, so that the coordinates of the reference point 46 in the 1st window W1 and the coordinates of the reference point 47 in the 2nd window W2 may become equal relatively by synchronous display processing, According to this embodiment which adjusts and carries out redisplay of the display position of the picture concerned in either window area of the 1st window W1 and the 2nd window W2, picture comparison between both windows can be performed easily. Since it performs on the basis of the specified reference point, as for the picture superposition after the above-mentioned synchronous display was performed, scrolling, or zooming processing, gap of the details of a photographic subject, the difference in a size, etc. can perform detailed comparative observation covering details easily. Such this embodiment is suitable for comparative observation (for example, an astronomic observation, microscope observation, etc.) in the picture which was combined with the system which carries out sequence control what is called of the electronic camera from remoteness, and was photoed periodically or intermittently.

[0043](Focus about an embodiment)

[1] The 1st displaying step (S1) that the image display method shown in the embodiment displays the 1st picture on the 1st screen area (W1) of applied monitor display (14), and displays the 2nd picture on the 2nd screen area (W2), Based on the display by the 1st displaying step (S1) of the above, the position arbitrarily set up by the operator, respectively about the 1st picture in the 1st screen (W1) of the above, and the 2nd picture in the 2nd screen of the above, The reference point recognition step (S3) recognized as each reference point (46, 47) on these 1st pictures and the 2nd picture, So that the coordinates of the reference point (46) in the 1st screen area (W1) of the above and the coordinates of the reference point (47) in the 2nd screen area (W2) of the above may become equal relatively. It is characterized by having the 2nd displaying step (S5) that adjusts and carries out redisplay of the display position of the picture concerned in the screen area of either one of [above] the 1st or the 2nd.

[0044][2] The directions step (S8) which the image display method shown in the embodiment is a method given in the above [1], and directs scrolling of the picture

concerned in the screen area of either one of [above] the 1st or the 2nd, It has further a step (S9) which scrolls the picture concerned in any of the above, or the screen area of another side synchronizing with the picture by which the above-mentioned scroll instruction was made.

[0045][3] The step (S8) which the image display method shown in the embodiment is a method the above [1] or given in either of [2], and directs change of the display magnification of the picture concerned in the screen area of either one of [above] the 1st or the 2nd, responding to directions of change of the above-mentioned display magnification -- one of the above -- it has further a step (S9) which changes the picture concerned in the screen area of another side into the same display magnification as the picture by which directions of the above-mentioned display magnification change were made

[0046][4] The step (6) which the image display method shown in the embodiment is a method the above [1] thru/or given in either of [3], and directs superposition of the 1st and 2nd picture of the above, responding to directions of the above-mentioned superposition -- the display image of the 1st screen area of the above, and the display image of the 2nd screen area of the above -- pile up -- it has further a step (S7) which displays a picture on the 3rd viewing area

[0047][5] In the information processor (1) which the information processor shown in the embodiment inputs the 1st and 2nd picture, and is put in order and displayed on monitor display (14), The 1st display control means (11) that displays the 1st picture of the above on the 1st screen area (W1) of above-mentioned monitor display (14), and displays the 2nd picture of the above on the 2nd screen area (W2), The setting means which makes the reference point (47) on the 2nd picture of the above specify in the 2nd screen area (W2) of the above while being based on the display by the 1st display control means of the above and making a user specify the reference point (47) on the 1st picture of the above in the 1st screen area (W1) of the above, So that the coordinates of the reference point (46) in the 1st screen area (W1) of the above and the coordinates of the reference point (47) in the 2nd screen area of the above may become equal relatively. The recording medium shown in the ** [6] embodiment which adjusts and carries out redisplay of the display position of the picture concerned in the screen area of either one of [above] the 1st or the 2nd, Based on the display by the step (S1) which displays the 1st picture on the 1st screen area (W1) of applied monitor display (14), and displays the 2nd picture on the 2nd screen area (W2), and the above-mentioned step (S1), The step (S3) which recognizes the position arbitrarily set up by the operator, respectively about the 1st picture in the 1st screen (W1) of the above, and the 2nd picture in the 2nd screen of the above as each reference point (46, 47) on these 1st pictures and the 2nd picture, The step (S5) which adjusts and carries out redisplay of the display position of the picture concerned in the screen area of either one of [above] the 1st or the 2nd so that the coordinates of the reference point (46) in the 1st screen area (W1) of the above and the coordinates of the reference point (47) in the 2nd screen area (W2) of the above may become equal relatively, It is the recording medium with which the program for performing the image display method which **** was recorded.

[0048]This invention is not limited to the embodiment mentioned above, but changes variously, and is feasible. For example, although the embodiment mentioned above explained the case where comparative observation of the picture of two sheets was carried out, same comparative observation can be performed by specifying and carrying out the synchronous display of the reference point also about the picture after the 3rd sheet also with the comparative observation of the picture of three or more sheets.

[0049]

[Effect of the Invention]As explained above, according to this invention, a reference point is specified as each of two or more display images, display images are associated, and the image display method which makes minute comparative observation possible can be provided because this performs a synchronous display. The information processor provided with a means to realize a described image display, and the recording medium, with which the program which realizes the image display was recorded can be provided.

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TECHNICAL FIELD

[Field of the Invention]This invention relates to the information processor provided with a means to realize the image display, and the recording medium, with which the program which realizes the image display was recorded, concerning the suitable image display method for the comparative observation of two or more pictures as which the same or different photographic subject was described.

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PRIOR ART

[Description of the Prior Art]Transmit the image data of the picture photoed by the electronic camera (it is also called a "digital still camera") etc. which spread is following quickly in recent years to information processors, such as what is called a personal computer (PC), and it is displayed, It has become easily to perform various image processing, such as a photo retouch, realizable. The utility value of the system which combined not only an electronic camera simple substance but an electronic camera, a special-purpose-machine machine, or general-purpose apparatus like an information processor is increasing day by day.

[0003]The picture of two or more sheets photoed by the electronic camera is displayed on monitor display side by side, and an example of the image comparing device for carrying out comparative observation is indicated to JP,6-6807,A. According to the device given in the gazette, picture comparison can be performed by easy operation, without dropping resolution on presenting a comparison display with the part images which do not perform a reducing process.

[0004]When not depending on exceptional structure like this image comparing device, in the former, the picture of two sheets is only indicated by parallel, And it was observing by an observer using the edit function which an observer sets and compares the relative physical relationship of the photographic subject between 2 pictures with mind, or is generally equipped in the information processor. For example, when comparative observation of the implementation order of expansion or a reducing process was carried out about the picture of the same photographic subject, full use of an edit function called "Undo; undoing" and "Redo; redo" using temporary storage (buffer) was made, image display was changed, and troublesome comparative observation was performed.

[0005]In the point that the display position of the photographic subject in a viewing area is unrelated, and is independently to it of other viewing areas, the structure of the image display for the comparative observation of these former is common. There is a problem that it is difficult to perform minute picture comparison.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention]As explained above, according to this invention, a reference point is specified as each of two or more display images, display images are associated, and the image display method which makes minute comparative observation possible can be provided because this performs a synchronous display. The information processor provided with a means to realize a described image display, and the recording medium, with which the program which realizes the image display was recorded can be provided.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]This invention is made in consideration of the above-mentioned situation, and is a thing.

The purpose is to provide the image display method which makes minute comparative observation possible because specify a reference point as *****, associate display images and this performs a synchronous display.

[0007]An object of this invention is to provide the information processor provided with a means to realize a described image display, and the recording medium, with which the program which realizes the image display was recorded.

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MEANS

[Means for Solving the Problem] In order to solve an aforementioned problem and to attain the purpose, this invention is constituted as follows.

[0009][1] The 1st displaying step that an image display method of this invention displays the 1st picture on the 1st screen area of applied monitor display, and displays the 2nd picture on the 2nd screen area, Based on a display by the 1st displaying step of the above, a position arbitrarily set up by operator, respectively about the 1st picture in the 1st screen of the above, and the 2nd picture in the 2nd screen of the above, A reference point recognition step recognized as each reference point on these 1st pictures and the 2nd picture, It has the 2nd displaying step that adjusts and carries out redisplay of the display position of the picture concerned in a screen area of either one of [above] the 1st or the 2nd so that coordinates of a reference point in the 1st screen area of the above and coordinates of a reference point in the 2nd screen area of the above may become equal relatively.

[0010][2] A directions step which an image display method of this invention is a method given in the above [1], and directs scrolling of the picture concerned in a screen area of either one of [above] the 1st or the 2nd, It has further a step which scrolls the picture concerned in any of the above, or a screen area of another side synchronizing with a picture by which the above-mentioned scroll instruction was made.

[0011][3] A step which an image display method of this invention is a method the above [1] or given in either of [2], and directs change of display magnification of the picture concerned in a screen area of either one of [above] the 1st or the 2nd, responding to directions of change of the above-mentioned display magnification -- one of the above -- it has further a step which changes the picture concerned in a screen area of another side into the same display magnification as a picture by which directions of the above-mentioned display magnification change were made

[0012][4] A step which an image display method of this invention is a method the above [1] thru/or given in either of [3], and directs superposition of the 1st and 2nd picture of the above, responding to directions of the above-mentioned superposition -- a display image of the 1st screen area of the above, and a display image of the 2nd screen area of the above -- pile up -- it has further a step which displays a picture on the 3rd viewing area

[0013][5] In an information processor which an information processor of this invention inputs the 1st and 2nd picture, and is put in order and displayed on monitor display, The 1st display control means that displays the 1st picture of the above on the 1st screen area of the above-mentioned monitor display, and displays the 2nd picture of the above on the 2nd screen area, Based on a display by the 1st display control means of the

above, a position arbitrarily set up by operator, respectively about the 1st picture in the 1st screen of the above, and the 2nd picture in the 2nd screen of the above, A reference point recognition means to recognize as each reference point on these 1st pictures and the 2nd picture, The 2nd display control means that adjusts and carries out redisplay of the display position of the picture concerned in a screen area of either one of [above] the 1st or the 2nd so that coordinates of a reference point in the 1st screen area of the above and coordinates of a reference point in the 2nd screen area of the above may become equal relatively is provided.

[0014][6] A step which a recording medium of this invention displays the 1st picture on the 1st screen area of applied monitor display, and displays the 2nd picture on the 2nd screen area, A step which recognizes a position arbitrarily set up by operator, respectively about the 1st picture in the 1st screen of the above, and the 2nd picture in the 2nd screen of the above based on a display by the above-mentioned step as each reference point on these 1st pictures and the 2nd picture, A step which adjusts and carries out redisplay of the display position of the picture concerned in a screen area of either one of [above] the 1st or the 2nd so that coordinates of a reference point in the 1st screen area of the above and coordinates of a reference point in the 2nd screen area of the above may become equal relatively, It is the recording medium with which a program for performing an image display method which **** was recorded.

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OPERATION

(OPERATION) According to this invention which adjusts and carries out redisplay of the display position of the picture concerned in a screen area of either one of the 1st or the 2nd, minute picture comparison of a multiple image can be easily performed so that coordinates of a reference point in the 1st screen area and coordinates of a reference point in the 2nd screen area may become equal relatively. Even if a display image of the 1st and 2nd screen area that passed through the above-mentioned redisplay piles both up as they are, gap does not produce it into a stillness (eternal) portion of the same photographic subject.

[0016]

[Embodiment of the Invention] The outline view in which "composition" drawing 1 shows the hardware constitutions of one embodiment of this invention, and drawing 2 are the block diagrams showing the hardware constitutions of this embodiment. As shown in the figure, this embodiment is the composition that the picture of two or more sheets which the electronic camera 2 was connected via the connecting cord 35 to the personal computer 1 so that communication was possible, and changed, and was photoed by the electronic camera 2 is transmitted to the personal computer 1 via the connecting cord 35.

[0017] As shown in drawing 2, the personal computer 1 is constituted by CPU11, the memory part 12, the display control part 13, the display 14, the drive device 15, the disc medium 16, the keyboard part 17, and the interface (I/F) 18.

[0018] CPU11 is a means to manage control of the whole device concerned that the image display functions concerning this invention should be realized. The memory part 12 provides the operating memory space which may be used by CPU11. The display 14 is controlled via the display control part 13, and consists of a CRT monitor, a liquid crystal display, etc. which display various kinds of information and pictures visually. The disc medium 16 is a recording medium which comprises a hard disk, a floppy disk or a magneto-optical disc, etc., and is a recording medium which records the program for making a described image display function realizable, or records other varieties of information. The drive device 15 is equipped with this disc medium 16, and read-out or the writing of information is performed by this drive device 15. It may be substituted for the disc medium 16 by semiconductor memory, such as a sized memory card. The keyboard part 17 is a means by which a user inputs various information to the personal computer 1. The interface (I/F) 18 is an interface for communicating with the electronic camera 2 which is an external instrument via the connecting cable 35 connected to the contact button 19.

[0019] Drawing 3 is a figure showing the GUI (graphical user interface) screen which realizes the picture comparison display concerning this embodiment. The GUI picture

shown in the figure is displayed on the image display device 14 via CPU11 and the display control part 13. In the figure, 41 piles up a reference point button, and 42 makes a synchronous display button and 43 pile up mutually, and A button, 44 -- a zooming button and 45 -- the 2nd window and 46 show the reference point on the 1st window W1, 47 shows the reference point on the 2nd window W2, and, as for the 1st window and W2, the pulldown list for display magnification change and W1 show the scroll bar 48-51. The reference point button 41 and the synchronous display button 42 are toggle buttons. In the pulldown list 45 for display magnification change, one of display magnification can be chosen as the condition of "25%", "50%", "75%", and "100%" from some display magnification candidates by operating the mouse 17a etc. It may be substituted for the operation by the above 41, 42, 43, 44, and 45 by the menu selecting means which is not illustrated.

[0020]The same picture can be displayed on the 1st window W1 and the 2nd window W2, or a respectively different picture can also be displayed on them. Although it supposes that it aligns right and left (level) and the 1st window W1 and the 2nd window W2 are displayed on the monitor display 14 like [it is desirable and] this embodiment, Even if it is the upper and lower sides (vertical) and a case where align aslant, or make it pile up a part of both each other's windows, and it displays, the effect of this invention can be acquired.

[0021]On the picture displayed on the 1st window W1, the reference point 46 is a point which a user can specify as arbitrary positions, for example, is displayed as cross cursor (crosshair cursor). The reference point 47 is a point displayed as cross cursor like the reference point 46 with regards to the 2nd window W2, and is a point which a user can specify as arbitrary positions on the display image of the window.

[0022]The scroll bars 48 are a means to scroll the display image in the 1st window W1 perpendicularly, and a means by which the scroll bar 50 scrolls the display image horizontally. Similarly, a means by which the scroll bar 49 scrolls the display image in the 2nd window W2 perpendicularly, and the scroll bar 51 are means to scroll the display image horizontally. With the mouse 17a etc., it can be operational and these scroll bars can scroll independently the display images of the 1st window W1 and the 2nd window W2.

[0023]Drawing 4 "of operation" is a flow chart which shows the flow of the picture comparison display by the above-mentioned GUI picture.

[0024]The picture which specifies an image file name in the predetermined menu which does not carry out "Step S1" graphic display, or is displayed on other windows by drags and drops to the window of the GUI picture concerned. The picture of two sheets which will perform comparative observation from now on is opened by each of the 1st window W1 and the 2nd window W2 (it opens). Drawing 5 (a) shows the displaying condition of each picture immediately after opening.

[0025]In the state immediately after displaying, the reference point 46 of the display image in the 1st window W1 and the reference point 47 of the display image in the 2nd window W2 are set as the left corner of a picture as a default, respectively.

[0026]When the reference point button 41 is pushed by the user in the state where the picture of two sheets of "Step S2" comparison object is displayed, it shifts to the reference point processing (refer to drawing 5 (b)) in Step S3.

[0027]As shown in "Step S3 (reference point processing)" drawing 5 (b), based on the image display in the 1st window W1, a user specifies the reference point 46 on the top of the mountains who are the photographic subjects displayed, for example. And based on the image display in the 2nd window W2, the reference point 47 is specified as the same point (mountains' peak) in the same photographic subject. Specifying a reference point first from the 2nd window W2, the appointed turn presupposes that it is arbitrary. The

display image of the 1st window W1 and the display image of the 2nd window W2 are associated about the specified reference points 46 and 47.

[0028]When the synchronous display button 42 is pushed by the user in the state where the picture of two sheets of a "step S4" comparison object is displayed, and the reference point is specified as each of these pictures, it shifts to the synchronous display processing (refer to drawing 5 (c)) in Step S3.

[0029]As shown in "Step S5 (synchronous display processing)" drawing 5 (c), so that the coordinates of the reference point 46 in the 1st window W1 and the coordinates of the reference point 47 in the 2nd window W2 may become equal relatively, Here, while the display position of the picture in the 2nd window W2 is adjusted, redisplay of the picture concerned is carried out.

[0030]Before carrying out a synchronous display, the field angle of both images had shifted, but this gap is canceled after a synchronous display by the display position adjustment on the basis of the above reference points. The display position of the mountains who are the photographic subjects of the display image in the 1st window W1, and the surface of a lake, and the display position of the mountains who are the photographic subjects of the display image in the 2nd window W2, and the surface of a lake are relatively in agreement so that clearly from the figure. This becomes easy to compare pictures among both windows over details.

[0031]When it piles up in the state where "Step S6" synchronous display is made and the button 43 is pushed, it shifts to the superposition processing (refer to drawing 6) in Step S7.

[0032]the display image of the 1st window W1 of "Step S7 (pile up processing)", and the display image of the 2nd window W2 -- each picture -- being translucent (for example, the luminance value of a pixel is made into a half) -- after carrying out, it piles up.

[0033]drawing 6 (a) should pile up -- one target picture (display image of the 1st window W1) should be shown, and (b) should pile up -- the picture (display image of the 2nd window W2) of target another side is shown, and (c) shows the picture after superposition. This superposition picture is displayed in the 3rd window (un-illustrating) other than 1st window W1 and 2nd window W2.

[0034]Even if it makes the display image of the 1st window W1 and the 2nd window W2 pile up mutually as it is during a synchronous display, gap does not arise in the invariable region of the same photographic subject between 2 pictures. When the "moon" which is a photographic subject is displayed on coordinates (x1, y1) in the 1st window W1 and is displayed on coordinates (x2, y2) in the 2nd window W2 by this, as [show / in drawing 6 (c)] -- pile up -- according to the picture, it is not based on the field angle of a picture, but the situation of movement of the "moon" can be correctly grasped now on the basis of "mountains."

[0035]In the state where the state where "Step S8" synchronous display is not performed, or the synchronous display is performed. When either the zooming button 44, the pulldown list 45 for display magnification change or the scroll bars 48-51 are pushed, it shifts to scrolling or zooming processing (refer to drawing 5 (d)) in Step S7.

[0036]When enlarging buttons "+" are pushed among the "step S9 (scrolling or zooming processing)" zooming buttons 44, the picture to which only predetermined magnification expanded the picture concerned is generated, and redisplay of this expansion picture is carried out to the same window. On the other hand, when the reduction button "-" is pushed, the picture to which only predetermined magnification reduced the picture concerned is generated, and redisplay of this reduction image is carried out to the same window. When the pulldown list 45 for display magnification change is pushed, as mentioned above, redisplay of the picture of the selected display magnification is

generated and carried out.

[0037]When it is in the state where the synchronous display is not performed, a zooming indication only of the picture of the selected window is given independently. Thereby, the display magnification of only one picture can be changed before execution of a synchronous display, and a rough field angle can be doubled with the picture of another side.

[0038]On the other hand, when it is in the state where the synchronous display is performed, a zooming indication of the display image of the 1st window W1 concerning a synchronous display and the picture of the 2nd window W2 is given on the basis of the reference point specified as each picture at the same simultaneous and display magnification.

[0039]When the scroll bars 48-51 are pushed, the display image of the window area concerned is level, or a scroll display is carried out perpendicularly. Thereby in the window concerned, a non-display imaging range can be displayed.

[0040]When it is in the state where the synchronous display is not performed, only the picture of the applicable window of the operated scroll bar scrolls independently.

[0041]On the other hand, when it is in the state where the synchronous display is performed, as shown in drawing 5 (d), not only the picture of the applicable window of the operated scroll bar but the picture of other windows concerning a synchronous display synchronizes (linkage), and is scrolled.

[0042]As explained above, so that the coordinates of the reference point 46 in the 1st window W1 and the coordinates of the reference point 47 in the 2nd window W2 may become equal relatively by synchronous display processing, According to this embodiment which adjusts and carries out redisplay of the display position of the picture concerned in either window area of the 1st window W1 and the 2nd window W2, picture comparison between both windows can be performed easily. Since it performs on the basis of the specified reference point, as for the picture superposition after the above-mentioned synchronous display was performed, scrolling, or zooming processing, gap of the details of a photographic subject, the difference in a size, etc. can perform detailed comparative observation covering details easily. Such this embodiment is suitable for comparative observation (for example, an astronomic observation, microscope observation, etc.) in the picture which was combined with the system which carries out sequence control what is called of the electronic camera from remoteness, and was photoed periodically or intermittently.

[0043] (Focus about an embodiment)

[1] The 1st displaying step (S1) that the image display method shown in the embodiment displays the 1st picture on the 1st screen area (W1) of applied monitor display (14), and displays the 2nd picture on the 2nd screen area (W2), Based on the display by the 1st displaying step (S1) of the above, the position arbitrarily set up by the operator, respectively about the 1st picture in the 1st screen (W1) of the above, and the 2nd picture in the 2nd screen of the above, The reference point recognition step (S3) recognized as each reference point (46, 47) on these 1st pictures and the 2nd picture, So that the coordinates of the reference point (46) in the 1st screen area (W1) of the above and the coordinates of the reference point (47) in the 2nd screen area (W2) of the above may become equal relatively. It is characterized by having the 2nd displaying step (S5) that adjusts and carries out redisplay of the display position of the picture concerned in the screen area of either one of [above] the 1st or the 2nd.

[0044][2] The directions step (S8) which the image display method shown in the embodiment is a method given in the above [1], and directs scrolling of the picture concerned in the screen area of either one of [above] the 1st or the 2nd, It has

further a step (S9) which scrolls the picture concerned in any of the above, or the screen area of another side synchronizing with the picture by which the above-mentioned scroll instruction was made.

[0045][3] The step (S8) which the image display method shown in the embodiment is a method the above [1] or given in either of [2], and directs change of the display magnification of the picture concerned in the screen area of either one of [above] the 1st or the 2nd, responding to directions of change of the above-mentioned display magnification -- one of the above -- it has further a step (S9) which changes the picture concerned in the screen area of another side into the same display magnification as the picture by which directions of the above-mentioned display magnification change were made

[0046][4] The step (6) which the image display method shown in the embodiment is a method the above [1] thru/or given in either of [3], and directs superposition of the 1st and 2nd picture of the above, responding to directions of the above-mentioned superposition -- the display image of the 1st screen area of the above, and the display image of the 2nd screen area of the above -- pile up -- it has further a step (S7) which displays a picture on the 3rd viewing area

[0047][5] In the information processor (1) which the information processor shown in the embodiment inputs the 1st and 2nd picture, and is put in order and displayed on monitor display (14), The 1st display control means (11) that displays the 1st picture of the above on the 1st screen area (W1) of above-mentioned monitor display (14), and displays the 2nd picture of the above on the 2nd screen area (W2), The setting means which makes the reference point (47) on the 2nd picture of the above specify in the 2nd screen area (W2) of the above while being based on the display by the 1st display control means of the above and making a user specify the reference point (47) on the 1st picture of the above in the 1st screen area (W1) of the above, So that the coordinates of the reference point (46) in the 1st screen area (W1) of the above and the coordinates of the reference point (47) in the 2nd screen area of the above may become equal relatively. The recording medium shown in the ** [6] embodiment which adjusts and carries out redisplay of the display position of the picture concerned in the screen area of either one of [above] the 1st or the 2nd, Based on the display by the step (S1) which displays the 1st picture on the 1st screen area (W1) of applied monitor display (14), and displays the 2nd picture on the 2nd screen area (W2), and the above-mentioned step (S1), The step (S3) which recognizes the position arbitrarily set up by the operator, respectively about the 1st picture in the 1st screen (W1) of the above, and the 2nd picture in the 2nd screen of the above as each reference point (46, 47) on these 1st pictures and the 2nd picture, The step (S5) which adjusts and carries out redisplay of the display position of the picture concerned in the screen area of either one of [above] the 1st or the 2nd so that the coordinates of the reference point (46) in the 1st screen area (W1) of the above and the coordinates of the reference point (47) in the 2nd screen area (W2) of the above may become equal relatively, It is the recording medium with which the program for performing the image display method which **** was recorded.

[0048]This invention is not limited to the embodiment mentioned above, but changes variously, and is feasible. For example, although the embodiment mentioned above explained the case where comparative observation of the picture of two sheets was carried out, same comparative observation can be performed by specifying and carrying out the synchronous display of the reference point also about the picture after the 3rd sheet also with the comparative observation of the picture of three or more sheets.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]The outline view showing the hardware constitutions of one embodiment of this invention

[Drawing 2]The block diagram showing the hardware constitutions of the above-mentioned embodiment

[Drawing 3]The figure showing the GUI (graphical user interface) screen which realizes the picture comparison display concerning the above-mentioned embodiment

[Drawing 4]The flow chart which shows the flow of the picture comparison display by the above-mentioned GUI picture

[Drawing 5]The figure for explaining the synchronous display and scrolling, or the zooming display concerning the above-mentioned embodiment

[Drawing 6]The figure explaining the superposition display concerning the above-mentioned embodiment which can be folded

[Description of Notations]

1 -- Personal computer (information processor)

11 -- CPU

12 -- Memory part

13 -- Display control part

14 -- Display

15 -- Drive device

16 -- Disc medium

17 -- Keyboard part

18 -- Interface (I/F)

19 -- Contact button

2 -- Electronic camera

21 -- Taking-lens system

22 -- Imaging system

23 -- A/D conversion circuit

24 -- Internal memory

25 -- Display control part

26 -- LCD

27 -- Compression expansion circuit

28 -- Attachment-and-detachment memory

29 -- System controller

30 -- Final controlling element

31 -- Stroboscope

32 -- External interface (I/F)
33 -- Contact button
35 -- Connecting cable
41 -- Reference point button
42 -- Synchronous display button
43 -- You make it pile each other up and it is a button.
44 -- Zooming button
45 -- List box for display magnification change
46, 47 -- Reference point
48-51 -- Scroll button

[Translation done.]

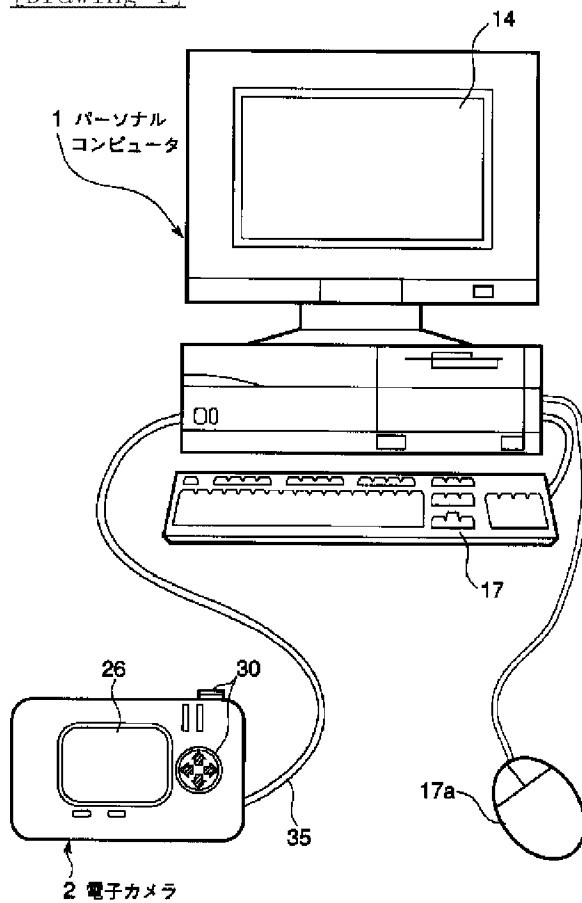
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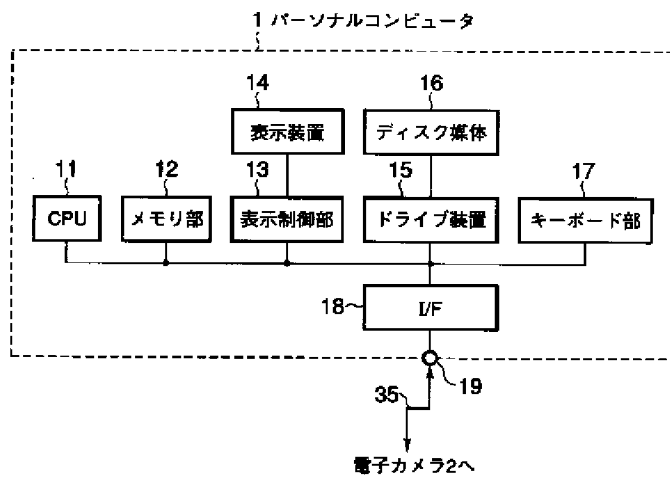
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DRAWINGS

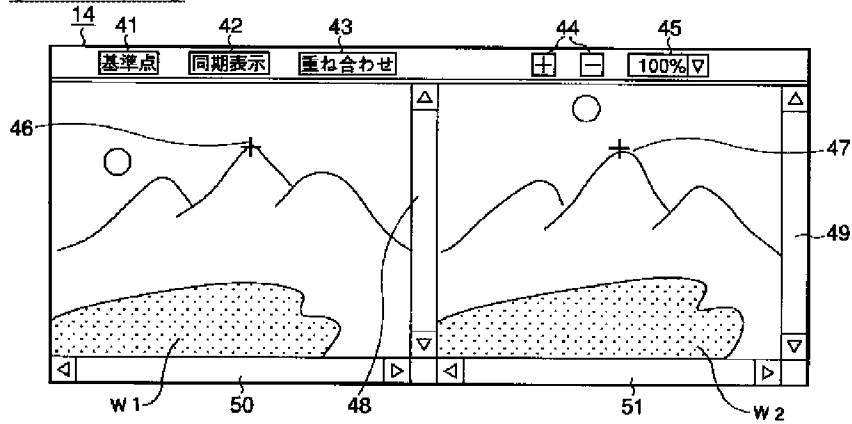
[Drawing 1]



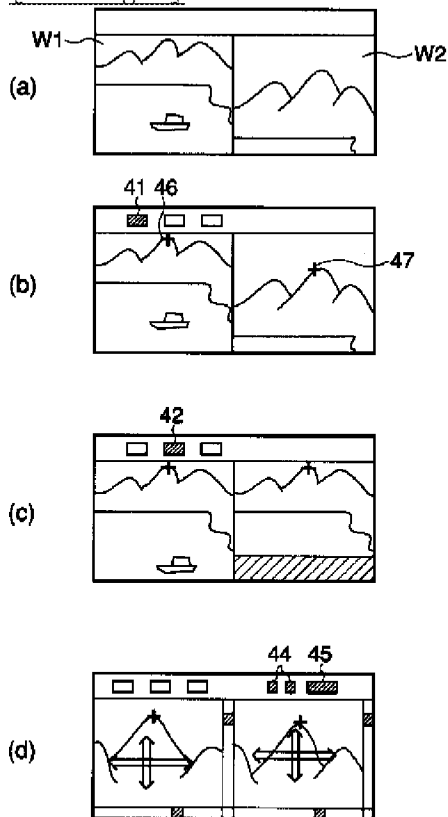
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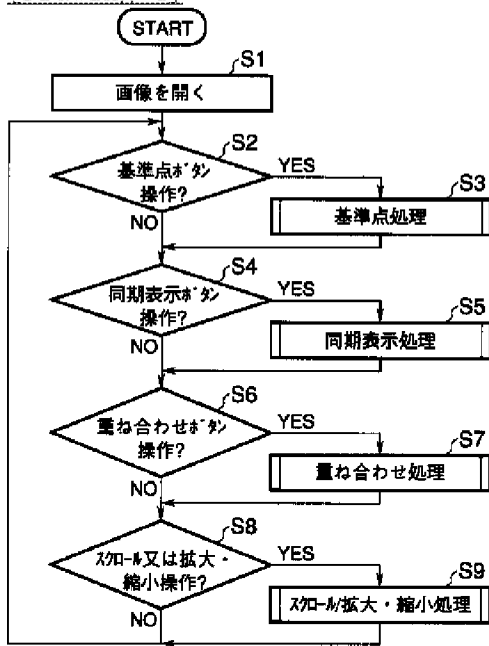
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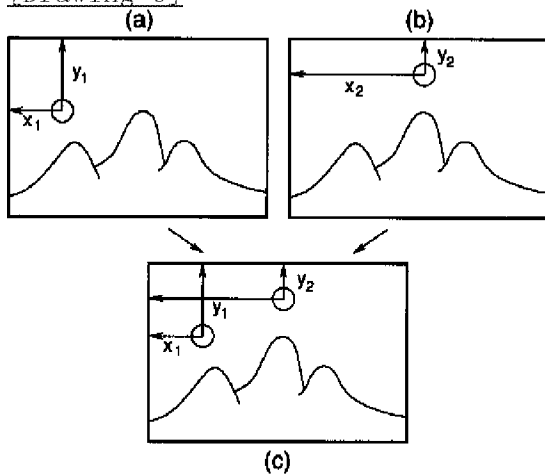
[Drawing 5]



[Drawing 4]



[Drawing 6]



[Translation done.]